

**WE CLAIM:**

1. A gas turbine fuel nozzle head, comprising:
  - a central fuel discharging orifice;
  - a first annular array of air discharging orifices surrounding the central fuel discharging orifice and communicating with an air source; and
  - a common annular outlet passage communicating with the first annular array of air discharging orifices, the common annular outlet passage having a curved annular transitional surface extending smoothly to a substantially radial and annular surface relative to a central axis of the fuel nozzle head for directing a first portion of a mixing air flow at a fuel flow exiting the fuel discharging orifice.
2. A gas turbine fuel nozzle head as claimed in claim 1 wherein the common annular outlet passage comprises a truncated conical surface smoothly connected to the curved annular transitional surface and extending inwardly for directing a second portion of the mixing air flow toward the fuel flow exiting the fuel discharging orifice.
3. A gas turbine fuel nozzle head as claimed in claim 2 wherein the truncated conical surface defines a plurality of grooves thereon extending inwardly and tangentially with respect to the central fuel discharging orifice.
4. A gas turbine fuel nozzle head as claimed in claim 3 comprising a plurality of mixing air

passages extending therethrough and terminating at the curved annular transitional surface, thereby forming the first annular array of air discharging orifices, the mixing air passages being disposed to align with the respective grooves such that the grooves form extensions of the respective mixing air passages.

5. A gas turbine fuel nozzle head as claimed in claim 3 wherein the substantially radial and annular surface of the common annular outlet passage extends inwardly and terminates at a central nozzle head orifice which is disposed downstream of the central fuel discharging orifice and which has a diameter greater than a diameter of the central fuel discharging orifice.
6. A gas turbine fuel nozzle head as claimed in claim 5 comprising a second annular array of air discharging orifices communicating with the air source for directing a guiding air flow, the second annular array of air discharging orifices surrounding the central nozzle head orifice, and being defined on a substantially radial and external surface of the fuel nozzle head which extends inwardly and terminates at the central nozzle head orifice.
7. A gas turbine fuel nozzle head as claimed in claim 6 comprising a plurality of guiding air passages extending tangentially therethrough with respect to the central axis of the fuel nozzle head and terminating at the substantially radial and external surface of the fuel nozzle head to

form the second annular array of air discharging orifices.

8. A gas turbine fuel nozzle head as claimed in claim 5 comprising a central air passage communicating with the air source and the central fuel discharging orifice, an annular fuel discharging passage being disposed around and communicating with the central air passage to direct the fuel flow exiting the central fuel discharging orifice with a central mixing air flow therein.
9. A gas turbine fuel nozzle head as claimed in claim 1 wherein the nozzle head comprises a plurality of pieces, and wherein said plurality includes a body and a cap co-operating to at least partially define the common outlet passage..
10. A gas turbine fuel nozzle head as claimed in claim 6 wherein the central nozzle head orifice comprises a periphery with a plurality of cut-outs to generate turbulence of a mixed fuel/air flow exiting the central nozzle head orifice.
11. A gas turbine fuel nozzle head as claimed in claim 10 wherein the cut-outs comprise a plurality of semi-circular openings circumferentially and evenly disposed around the orifice.
12. A gas turbine fuel nozzle head, comprising:  
a central fuel discharging orifice;

- a first annular array of air discharging orifices surrounding the central fuel discharging orifice and communicating with an air source;
  - a common annular outlet passage communicating with the first annular array of air discharging orifices, the common annular outlet passage having a substantially radial and annular surface relative to a central axis of the fuel nozzle head for directing a first portion of a mixing air flow substantially perpendicularly towards a fuel flow exiting the fuel discharging orifice; and
  - a second annular array of air discharging orifices surrounding the common annular outlet passage and communicating with the air source for directing a guiding air flow angularly towards a mixed fuel/air flow.
13. A gas turbine fuel nozzle head as claimed in claim 11 comprising an end defining a substantially radial and external surface round a central orifice therein, the central orifice communicating with the common annular outlet passage and the central fuel discharging orifice for discharging the mixed fuel/air flow.
14. A gas turbine fuel nozzle head as claimed in claim 13 wherein the substantially radial and annular surface of the common annular outlet passage extends inwardly and terminates at the central orifice of the fuel nozzle head, the central orifice having a diameter greater than a diameter of the central fuel discharging orifice.

15. A gas turbine fuel nozzle head as claimed in claim 12 wherein the common annular outlet passage comprises a truncated conical surface for directing a second portion of the mixing air flow angularly towards the fuel flow exiting the central fuel discharging orifice, the truncated conical surface being disposed upstream of the substantially radial and annular surface of the common annular outlet passage with respect to the fuel flow.
16. A gas turbine fuel nozzle head as claimed in claim 15 comprising a plurality of mixing air passages extending tangentially with respect to the central fuel discharging orifice, to the common annular outlet passage, extensions of the mixing air passage in the common annular outlet passage forming a plurality of grooves defined in the truncated surface, respectively.
17. A gas turbine fuel nozzle head as claimed in claim 16 wherein the common annular outlet passage comprises a curved annular transitional surface smoothly connecting the substantially radial and annular surface and the truncated conical surface.
18. A gas turbine fuel nozzle head as claimed in claim 15 comprising an annular surface extending from a central hole, radially, outwardly and in a downstream direction relative to the fuel flow, terminating at the central fuel discharging orifice, the central hole communicating with a fuel passage.

19. A gas turbine fuel nozzle head as claimed in claim 15 comprising a central air passage communicating with the air source and the central fuel discharging orifice, an annular fuel discharging passage being disposed around and communicating with the central air passage such that the fuel flow exits the central fuel discharging orifice with a central mixing air flow therein.
20. A gas turbine fuel nozzle head as claimed in claim 12 wherein the nozzle head comprises a plurality of pieces, and wherein said plurality includes a body and a cap co-operating to at least partially define the common outlet passage.